Dr. Yunlong Wang

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Research Interests

Pattern Recognition, Machine Learning, Light field Photography, and Biometrics.

Academic Positions

- **Associate Professor**   since Apr. 2022
  Center for Research on Intelligent Perception and Computing (CRIPAC),
  Institute of Automation, Chinese Academy of Sciences (CASIA)

- **Assistant Professor**   Jul. 2019 - Mar. 2022
  Center for Research on Intelligent Perception and Computing (CRIPAC),
  Institute of Automation, Chinese Academy of Sciences (CASIA)

Education

- **University of Science and Technology of China, Hefei, China**   Aug. 2014 - Jun. 2019
  Ph.D. in pattern recognition and intelligent system, advisor: Prof. Tieniu Tan
  Dissertation: Light Field Image Enhancement and Recognition

- **University of Science and Technology of China, Hefei, China**   Aug. 2010 - Jun. 2014
  B.Eng. in Automation (Honors program)

Projects and Funds

- **Iris Liveness Detection and Recognition Based on Hybrid Light Field Imaging**
  Youth Fund Project of National Natural Science Foundation of China, Jan. 2021 – Dec. 2023

- **Computational Imaging Techniques for High-throughput Iris Recognition**
  General Program of National Natural Science Foundation of China, Jan. 2021 – Dec. 2024

- **Large-scale Iris Image Generation**
  General Program of National Natural Science Foundation of China, Jan. 2022 – Dec. 2025

- **Federated Learning for Biometrics Recognition**
  CAAI-Huawei Mindspore Open Fund, Jan.2022 – Oct.2022

- **Smart Iris Recognition Systems**
  Repository: https://www.researchgate.net/project/Research-on-Smart-Iris-Recognition-systems, since Jul. 2019

- **Computational Light Field Imaging Devices and Algorithms**
  Repository: https://www.researchgate.net/project/Computational-Light-Field-Imaging-Devices-and-Algorithms, since Oct. 2016

Awards and Honors

- Young Elite Scientist Sponsorship Program by the Beijing Association for Science and Technology, 2023-2025.
- IJCB 2023 Best Student Paper Award (presented to co-supervised student Haiqing Li), 2023.
- The second prize of Industry-University-Research Cooperation Innovation Achievement Award of China Industry-University-Research Institute Collaboration Association (CIUR), 2023.
- The second prize of Technology Invention Award of China Society of Image and Graphics (CSIG), 2022.
- Excellent Paper of Journal of Image and Graphics (JIG), 2022.
- Best Paper Award Runner-up, International Joint Conference on Biometrics (IJCB), 2020.
- Outstanding project in CAAI-Huawei Mindspore Open Fund

Professional Activity

- **Editorial Board**
  Electronics (IF 2.9, Citescore 4.7), Guest Editor
  Computer Science (CCF-B, T2), Executive Editor

- **Reviewing**
  Journals: IJCV, IEEE TIP, IEEE TIFS, IEEE TCSVT, IEEE TCI, IEEE TVCG, IEEE JSTSP, IEEE TBIOM, IEEE SPL, IEEE/CAA JAS, Neurocomputing.
  Conferences: CVPR, ICCV, AAAI, IJCB, CCBR.

- **Organizing committee**
  "NIR Iris Challenge Evaluation in Non-cooperative Environments: Segmentation and Localization" Competition at IJCB 2021
  PC member of CCBR 2019, 2021, 2022

- **Invited talks**
  Chinese Conference on Biometric Recognition 2023 (CCBR 2023), Xuzhou, China.
  Hosted by CASIA and CUMT, Dec. 2023.
  IEEE International Joint Conference on Biometrics (IJCB 2023), Ljubljana, Slovenia.
  Hosted by University of Ljubljana, Slovenia, Sep. 2023.
  Chinese Conference on Biometric Recognition 2022 (CCBR 2022), online.
  Hosted by CAAI and CASIA, Oct. 2022.
  Beijing University of Civil Engineering and Architecture, Beijing, China.
  Hosted by Assistant Professor Caiyong Wang, Nov. 2022
  Beijing University of Posts and Telecommunications, Beijing, China.
  Hosted by Prof. Zhaofeng He, Dec. 2021
  Beijing Normal University, Beijing, China.
  Hosted by Prof. Yongzhen Huang, Aug. 2021

Publications

- **Journal Paper († co-first author, * corresponding author)**

  [1] Artificial Immune System of Secure Face Recognition Against Adversarial Attacks.
    Min Ren†, **Yunlong Wang**†, Yuhao Zhu, Yongzhen Huang, Zhenan Sun, Qi Li, Tieniu Tan.
    International Journal of Computer Vision (**IJCV**), 2024.

  [2] Understanding Deep Face Representation via Attribute Recovery.
    Min Ren, Yuhao Zhu, **Yunlong Wang**, Yongzhen Huang, Zhenan Sun.
    IEEE Transactions on Information Forensics and Security (**TIFS**), 2024.

[3] Multi-Faceted Knowledge-Driven Graph Neural Network for Iris Segmentation.
Jianze Wei, **Yunlong Wang***, Xingyu Gao*, Ran He, Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2024.

[4] Sclera-TransFuse: Fusing Vision Transformer and CNN for Accurate Sclera Segmentation and Recognition.
Caiyong Wang, Haiqing Li, Yixin Zhang, Guangzhe Zhao, **Yunlong Wang**, Zhenan Sun.
IEEE Transactions on Biometrics, Behavior, and Identity Science (**TBIOM**), 2024.

[5] Multiscale Dynamic Graph Representation for Biometric Recognition with Occlusions.
Min Ren†, **Yunlong Wang**†, Yuhao Zhu, Kunbo Zhang, Zhenan Sun.
IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**), 2023.

[6] Personalized Graph Generation for Monocular 3D Human Pose and Shape Estimation.
Junxing Hu, Hongwen Zhang, **Yunlong Wang**, Min Ren, Zhenan Sun.
IEEE Transactions on Circuits and Systems for Video Technology (**T-CSVT**), 2023.

[7] AIF-LFNet: All-in-Focus Light Field Super-Resolution Method Considering the Depth-Varying Defocus.
Shubo Zhou, Liang Hu, **Yunlong Wang**, Zhenan Sun, Kunbo Zhang, Xueqin Jiang.
IEEE Transactions on Circuits and Systems for Video Technology (**T-CSVT**), 2023.

[8] IrisGuideNet: Guided Localization and Segmentation Network for Unconstrained Iris Biometrics
Jawad Muhammad, Caiyong Wang, **Yunlong Wang**, Kunbo Zhang, Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2023.

[9] Contextual Measures for Iris Recognition.
Jianze Wei, **Yunlong Wang***, Huaibo Huang, Ran He, Zhenan Sun, Xingyu Gao*.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2023.

[10] Exploring Bias in Sclera Segmentation Models: A Group Evaluation Approach.
Matej Vitek, ..., Caiyong Wang, Yunlong Wang, Zhaofeng He, Zhenan Sun,....
IEEE Transactions on Information Forensics and Security (**TIFS**), 2023.

[11] Balanced Representation Learning for Long-tailed Skeleton-based Action Recognition
Hongda Liu, **Yunlong Wang**, Min Ren, Junxing Hu, Zhengquan Luo, Guangqi Hou, Zhenan Sun.
Machine Intelligence Research (**MIR**), 2023.

[12] Federated Local Compact Representation Communication: Framework and Application
Zhengquan Luo, **Yunlong Wang**, Zilei Wang.
Machine Intelligence Research (**MIR**), 2023.

[13] Boosting multi-modal ocular recognition via spatial feature reconstruction and unsupervised image quality estimation
Zihui Yan, Lingxiao He, **Yunlong Wang**, Kunbo Zhang, Zhenan Sun.
Machine Intelligence Research (**MIR**), 2022.

[14] CASIA-Iris-Africa: A Large-scale African Iris Image Database
Jawad Muhammad, Yunlong Wang, Junxing Hu, Kunbo Zhang, Zhenan Sun.
Machine Intelligence Research (**MIR**), 2022.

[15] Perturbation Inactivation Based Adversarial Defense for Face Recognition.
Min Ren, Yuhao Zhu, **Yunlong Wang***, Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2022.

[16] Combining 2D texture and 3D geometry features for Reliable iris presentation attack

detection using light field focal stack.
Zhengquan Luo, **Yunlong Wang***, Nianfeng Liu, Zilei Wang.
IET Biometrics, 2022.

[17] Towards Interpretable Defense against Adversarial Attacks via Causal Inference.
Min Ren, **Yunlong Wang***, Zhaofeng He.
Machine Intelligence Research (**MIR**), 2022.

[18] Towards More Discriminative and Robust Iris Recognition by Learning Uncertain Factors.
Jianze Wei, Huaibo Huang, **Yunlong Wang***, Ran He, Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2022.

[19] Multitask Deep Active Contour-based Iris Segmentation for Off-Angle Iris Images.
Tianhao Lu, Caiyong Wang, **Yunlong Wang**, Zhenan Sun.
Journal of Electronic Imaging (**JEI**), 2022.

[20] Overview of biometrics research (in Chinese).
Zhenan Sun , He Ran , Liang Wang, ..., **Wang Yunlong** , others.
Journal of Image and Graphics (**JIG**), 2022.

[21] Cross-spectral Iris Recognition by Learning Device-specific Band.
Jianze Wei†, **Yunlong Wang**†, Yi Li, Ran He, Zhenan Sun.
IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), 2021.

[22] CASIA-Face-Africa: A Large-scale African Face Image Database.
Muhammad Jawad, **Yunlong Wang**, Caiyong Wang, Kunbo Zhang, Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2021.

[23] High-fidelity View Synthesis for Light Field Imaging with Extended Pseudo 4DCNN.
Yunlong Wang, Fei Liu, Kunbo Zhang, Zilei Wang, Zhenan Sun, Tieniu Tan.
IEEE Transactions on Computational Imaging (**TCI**), 2020.

[24] Flexible Iris Matching Based on Spatial Feature Reconstruction.
Zihui Yan, Lingxiao He, **Yunlong Wang**, Zhenan Sun, Tieniu Tan.
IEEE Transactions on Biometrics, Behavior, and Identity Science (**TBIOM**), 2021.

[25] Towards Complete and Accurate Iris Segmentation Using Deep Multi-task Attention Network for Non-Cooperative Iris Recognition.
Caiyong Wang, Jawad Muhammad, **Yunlong Wang**, Zhaofeng He and Zhenan Sun.
IEEE Transactions on Information Forensics and Security (**TIFS**), 2020.

[26] ScleraSegNet: An Attention Assisted U-Net Model for Accurate Sclera Segmentation.
Caiyong Wang, **Yunlong Wang**, Yunfan Liu, Zhaofeng He, Ran He and Zhenan Sun.
IEEE Transactions on Biometrics, Behavior, and Identity Science (**TBIOM**), 2020.

[27] Binocular Light-Field: Imaging Theory and Occlusion-Robust Depth Perception Application.
Fei Liu, Shubo Zhou, **Yunlong Wang**, Zhenan Sun, Tieniu Tan.
IEEE Transactions on Image Processing (**TIP**), 2019.

[28] Iris Liveness Detection Based on Light Field Imaging.
Ping Song, Ling Huang, **Yunlong Wang**, Fei Liu, Zhenan Sun.
IEEE/CAA Journal of Automatica Sinica (**JAS**), 2019.

[29] LFNet: A Novel Bidirectional Recurrent Convolutional Neural Network for Light-Field Image Super-Resolution.

Yunlong Wang, Fei Liu, Kunbo Zhang, Guangqi Hou, Zhenan Sun, Tieniu Tan.
IEEE Transactions on Image Processing (**TIP**), 2018.

- **Conference full paper**

  [1] 6-DoF Grasp Detection in Clutter with Enhanced Receptive Field and Graspable Balance Sampling
  Hanwen Wang, Zhang Ying, **Yunlong Wang**, Jian Li.
  IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2024.

  [2] Learning Explicit Contact for Implicit Reconstruction of Hand-held Objects from Monocular Images
  Junxing Hu, Hongwen Zhang, Zerui Chen, Mengcheng Li, **Yunlong Wang**, Yebin Liu, Zhenan Sun.
  Thirty-Eighth AAAI Conference on Artificial Intelligence (**AAAI**), 2024.

  [3] Sensing Micro-Motion Human Patterns using Multimodal mmRadar and Video Signal for Affective and Psychological Intelligence.
  Yiwei Ru, Peipei Li, Muyi Sun, **Yunlong Wang**, Kunbo Zhang, Qi Li, Zhaofeng He, Zhenan Sun.
  ACM International Conference on Multimedia (**ACM MM**), 2023.

  [4] Sclera-TransFuse: Fusing Swin Transformer and CNN for Accurate Sclera Segmentation.
  Haiqing Li, Caiyong Wang, Guangzhe Zhao, Zhaofeng He, **Yunlong Wang**, Zhenan Sun.
  International Joint Conference on Biometrics (**IJCB**), 2023.
  Best Student Paper Award

  [5] PDVN: A Patch-based Dual-view Network for Face Liveness Detection using Light Field Focal Stack.
  Yunlong Wang, Mupei Li, Zhengquan Luo, Zhenan Sun.
  International Joint Conference on Biometrics (**IJCB**), 2022.

  [6] D-ESRGAN: A Dual-Encoder GAN with Residual CNN and Vision Transformer for Iris Image Super-Resolution.
  Caiyong Wang, Tianhao Lu, Gaosheng Wu, **Yunlong Wang**, Zhenan Sun.
  International Joint Conference on Biometrics (**IJCB**), 2022.

  [7] Disentangled Federated Learning for Tackling Attributes Skew via Invariant Aggregation and Diversity Transferring.
  Zhengquan Luo , **Yunlong Wang*** , Zilei Wang , Zhenan Sun , Tieniu Tan.
  International Conference on Machine Learning (**ICML**), 2022.

  [8] An Empirical Comparative Analysis of Africans with Asians Using DCNN Facial Biometric Models.
  Jawad Muhammad, **Yunlong Wang**, Leyuan Wang, Kunbo Zhang, Zhenan Sun.
  Chinese Conference on Biometric Recognition (**CCBR**), 2022.

  [9] FedIris: Towards More Accurate and Privacy-preserving Iris Recognition via Federated Template Communication.
  Zhengquan Luo, **Yunlong Wang*,** Zilei Wang, Zhenan Sun, Tieniu Tan.
  Computer Vision and Pattern Recognition Workshops (**CVPRW**), 2022.

  [10] Learning Instance-level Spatial-Temporal Patterns for Person Re-identification.
  Min Ren, Lingxiao He, Xingyu Liao, Wu Liu, **Yunlong Wang**, Tieniu Tan.
  International Conference on Computer Vision (**ICCV**), 2021.

  [11] NIR Iris Challenge Evaluation in Non-cooperative Environments: Segmentation and

Localization.
Caiyong Wang, **Yunlong Wang**, Kunbo Zhang, Jawad Muhammad, Tianhao Lu, Qi Zhang, Qichuan Tian, Zhaofeng He, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2021.

[12] A Large-scale Database for Less Cooperative Iris Recognition.
Junxing Hu, Leyuan Wang, Zhengquan Luo, **Yunlong Wang**∗, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2021.

[13] An End-to-End Autofocus Camera for Iris on the Move.
Leyuan Wang, Kunbo Zhang, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2021.

[14] Iris Normalization Beyond Appr-Circular Parameter Estimation.
Zhengquan Luo, Haiqing Li, **Yunlong Wang**, Zilei Wang, Zhenan Sun.
Chinese Conference on Biometric Recognition (**CCBR**), 2021.

[15] A Novel Deep-learning Pipeline for Light Field Image Based Material Recognition.
Yunlong Wang, Kunbo Zhang, Zhenan Sun.
International Conference on Pattern Recognition (**ICPR**). 2021.

[16] A Lightweight Multi-Label Segmentation Network for Mobile Iris Biometrics.
Caiyong Wang, **Yunlong Wang**, Boqiang Xu, Yong He, Zhiwei Dong, Zhenan Sun.
International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), 2020.

[17] Dynamic Graph Representation for Occlusion Handling in Biometrics.
Min Ren, **Yunlong Wang**, Zhenan Sun, Tieniu Tan.
Thirty-Fourth AAAI Conference on Artificial Intelligence (**AAAI**), 2020.

[18] Recognition Oriented Iris Image Quality Assessment in the Feature Space.
Leyuan Wang, Kunbo Zhang, Min Ren, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2020.

[19] All-in-Focus Iris Camera with a Great Capture Volume.
Kunbo Zhang, Zhenteng Shen, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2020.
Best Paper Award Runner-up

[20] SSBC 2020: Sclera Segmentation Benchmarking Competition in The Mobile Environment.
Junxing Hu, Yonghe He, Caiyong Wang, Hui Liu, **Yunlong Wang**, Zhenan Sun.
International Joint Conference on Biometrics (**IJCB**), 2020.

[21] Alignment Free and Distortion Robust Iris Recognition.
Min Ren, Caiyong Wang, **Yunlong Wang**, Zhenan Sun, Tieniu Tan.
International Conference on Biometrics (**ICB**), 2019.

[22] Cross-Sensor Iris Recognition Using Adversarial Strategy and Sensor-Specific Information.
Jianze Wei, **Yunlong Wang**, Xiang Wu, Zhaofeng He, Ran He, Zhenan Sun.
International Conference on Biometrics: Theory, Applications and Systems (**BTAS**), 2019.

[23] End-to-end View Synthesis for Light Field Imaging with Pseudo 4DCNN.
Yunlong Wang, Fei Liu, Zilei Wang, Guangqi Hou, Zhenan Sun, Tieniu Tan.
European Conference on Computer Vision (**ECCV**), 2018.

[24] A Simple and Robust Super Resolution Method For Light Field Images.
Yunlong Wang, Guangqi Hou, Zhenan Sun, Zilei Wang, Tieniu Tan.
International Conference on Image Processing (**ICIP**), 2016.

[25] 4D Light-Field Sensing System for People Counting.

Guangqi Hou, Chi Zhang, **Yunlong Wang**, Zhenan Sun.
Photonic and Optoelectronic Integrated Circuits XVIII (**SPIE OPTO**), 2016.

Patents

[1] Zhengquan Luo, Zhenan Sun, Yunlong Wang, "Iris Image Feature Extraction Method and System Based on Federated Learning, And Apparatus", PCT/CN2021/092794, publication date 05/10/2021.

[2] Zhenan Sun, Yunlong Wang, Zhengquan Luo, Kunbo Zhang, Qi Li, Yong He. "Disentangled Personalized Federated Learning Method for Consensus Representation Extraction and Diversity Propagation", PCT/CN2022/135821, publication date 08/06/2023.

[3] Zhenan Sun, Yunlong Wang, Zhengquan Luo, Kunbo Zhang, Qi Li, Yong He. "Node Model Updating Method for Resisting Bias Transfer in Federated Learning", PCT/CN2022/135819, publication date 15/06/2023.

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